



## Editorial

# Physical Activity in Chronic Obstructive Pulmonary Disease. An Update<sup>☆</sup>



## La actividad física en la enfermedad pulmonar obstructiva crónica. Puesta al día

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In recent years, physical activity has come from being an almost unknown variable to being a significant parameter in research into chronic obstructive pulmonary disease (COPD). This change has occurred in parallel with others: the recognition of COPD as a multidimensional disease, prioritization of applied research (as opposed to basic research) by stakeholders, and the active involvement/participation of patients in the management of their disease.

One of the most interesting developments in recent years is the acceptance of physical activity as a key factor in understanding the course of COPD. Many high-quality original studies have shown that higher levels of physical activity are associated with a lower risk of exacerbations, hospitalization, and death in COPD patients.<sup>1</sup> This association has been consistently observed across different individual characteristics, geographic settings, and instruments for measuring physical activity, and has been shown to be independent of spirometric severity and other predictors of COPD progress. Accordingly, systematic reviews of the scientific literature classify the association between physical activity and COPD progress as consistent and moderate–high quality evidence. Furthermore, among the parameters used to predict mortality in COPD patients, physical activity level has been shown to be more discriminatory than lung function, respiratory symptoms, quality of life, exercise capacity, body composition, or other parameters of cardiovascular function.<sup>2</sup> Nowadays, it seems inconceivable to study COPD progress without taking into account an evaluation of physical activity.

Consequently, research into the development and validation of instruments for measuring physical activity in COPD patients has proliferated in recent years, and the most important development in this field involves rethinking the concept of physical activity adapted to patient needs. Physical activity is conventionally defined as “any bodily movement that results in energy expenditure”.<sup>3</sup> This definition, which is still valid for many healthcare objectives, does

not adequately explain patient behavior, i.e., understanding why, among patients with the same severity of COPD, some are physically active, while others are not. Behavior cannot be changed if it is not understood. The European PROactive (Physical Activity as a Crucial Patient Reported Outcome in COPD) Project took a step forward when it conceptualized physical activity from the point of view of the COPD patient<sup>4</sup> and developed instruments to measure this new construct, namely, the “physical activity experience”, constituted by 2 components of physical activity: “amount of physical activity” and “difficulty with physical activity”. To encompass the entire concept, the 2 versions of the PROactive Physical Activity (PPAC) in COPD, the daily version (D-PPAC) and the clinic visit version (C-PPAC), are hybrid instruments that combine a short questionnaire with 2 variables derived from accelerometers.<sup>5</sup> These tools, which provide 3 scores (total physical activity, amount, and difficulty), were validated with respect to validity and repeatability. They are in the process of receiving approval from the European Medicines Agency, and are being used in various clinical trials to study their sensitivity to change. It is foreseeable that future research on the physical activity of COPD patients, its determinants, its effects, and the interventions that can modify it, will require the use of these PPACs.

The third recent development worthy of mention is the emergence of interventions for increasing physical activity in COPD patients,<sup>6</sup> although the quality of evidence available so far is still low or very low.<sup>1,6</sup> Pulmonary rehabilitation programs have been beneficial in increasing exercise capacity, but improvements were not accompanied by changes in patient behavior (i.e., changes in physical activity habits). Many different interventions have been recently designed, some combining traditional physical training activities and others not, that incorporate aspects of behavioral psychology, such as motivation, goal-setting, identification of barriers, or self-efficacy. Several of these interventions use information and communication technologies, such as cellphones or websites, to create individualized, more flexible and automated therapy regimens. Some of the more recent interventions, particularly those incorporating motivational techniques and elements of positive feedback, have managed to increase levels of physical activity, but only in the short term.<sup>7</sup> It should be emphasized that these new interventions are not limited to non-pharmacological therapy;

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physical activity has also been recently included as a primary outcome variable in several clinical drug trials sponsored by the pharmaceutical industry, given its importance in the prognosis of COPD and its value for patients.<sup>8</sup> Finally, it should also be mentioned that most of the interventions are context-dependent, so successful interventions would have to be reproduced, adapted and validated in other settings.

To summarize, physical activity is a significant parameter for patients, caregivers, investigators, and healthcare professionals. In view of the evidence that the most common complaint from COPD patients is that they “could not complete the activities they like to do”,<sup>9</sup> it is essential that we gain an understanding of the role of physical activity in patient prognosis, become familiar with the tools used to measure it, and design interventions to modify behavior in the long term.

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